

WE CLAIM:

1. A non-stoichiometric material, wherein

the domain size of the material is less than 250 nanometers,

the relative ratios of elements in the composition of the material differ by more than 1% from stoichiometric values, and

the composition of the material is substantially uniform at the lattice level.
2. The composition of matter of claim 1 wherein the composition of the material comprises oxygen.
3. The composition of matter of claim 1 wherein the composition of the material comprises nitrogen.
4. The composition of matter of claim 1 wherein the composition of the material comprises boron.
5. The composition of matter of claim 1 wherein the composition of the material comprises carbon.
6. The composition of matter of claim 1 wherein the composition of the material comprises chalcogenides.
7. The composition of matter of claim 1 wherein the composition of the material comprises halide.
8. The composition of matter of claim 1 wherein the composition of the material comprises two or more metals.
9. A coating comprising the non-stoichiometric material of claim 1.
10. A catalyst comprising the non-stoichiometric material of claim 1.
11. A device comprising the non-stoichiometric material of claim 1.

12. A product comprising the non-stoichiometric material of claim 1.
13. An ink comprising the non-stoichiometric material of claim 1.
14. A pigment comprising the non-stoichiometric material of claim 1.
15. The composition of matter of claim 1 wherein the domain size of the material is less than 100 nanometers.